

Application No. 10/765,754

Filed: 1/27/04

TC Art Unit: 3737

Confirmation No.: 1899

AMENDMENT TO THE CLAIMS**RECEIVED
CENTRAL FAX CENTER
MAR 01 2007**

1. (Currently Amended) A spectroscopic diagnostic system for measuring tissue comprising:

a laser emitting radiation ~~in~~ having an infrared ~~spectrum~~ wavelength;

a fiber optic ~~eable~~ catheter optically coupled to the laser that delivers the infrared radiation ~~to~~ in a radial direction at a distal end of the fiber optic ~~eable~~ onto tissue and catheter to illuminate a portion of a wall of a body lumen such that the catheter collects Raman shifted radiation returning radially from the ~~tissue~~ body lumen for delivery to a proximal end of the ~~eable~~ catheter;

a spectral analyzer that is optically coupled to the fiber optic ~~eable~~ catheter to receive the collected Raman shifted radiation from the fiber optic ~~eable~~ catheter; and

a ~~charge coupled device~~ detector that is optically coupled to the spectral analyzer and that detects radiation received from the spectral analyzer.

2. (Currently Amended) The system of Claim 1 further comprising a data processor that removes background components from the detected light to provide corrected Raman spectral data and analyzes the corrected Raman spectral data to diagnose a condition of the portion of the ~~tissue~~ body lumen.

3. (Currently Amended) The system of Claim 2 wherein the detector ~~detectes~~ detects a plurality of Raman shifted frequencies such that the data processor analyzes the plurality of shifted frequencies to diagnose the ~~tissue~~ body lumen.

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4. (Currently Amended) The system of Claim 1 wherein the system collects light returning from the tissue-body lumen for a period of 5 minutes or less.

5. (Original) The system of Claim 1 wherein the laser emits light having an average incident power between 2 and 20 m W.

6. (Currently Amended) A method of spectroscopic diagnosis of tissue of a patient comprising:

irradiating a portion of tissue of a patient to be diagnosed with laser radiation directed radially onto the tissue of a body lumen through a fiber optic-~~cable~~ catheter;

detecting light emitted by the portion of tissue returning radially to a distal end of the catheter in response to the radiation with a charge coupled device that is optically coupled to a proximal end of the fiber optic-~~cable~~ catheter, the device collecting the light for a period of 5 minutes or less, the light having a Raman shifted frequency component different from the irradiating frequency;

processing the detected light to provide corrected Raman spectral data to diagnose a condition of the portion of tissue.

7. (Original) The method of Claim 6 wherein the detecting step further comprises detecting a plurality of Raman shifted frequency components and background light components and the analyzing step further comprises analyzing the plurality of Raman shifted frequency components to diagnose the tissue.

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8.(Original) The method of Claim 7 further comprises removing the background light components from the detected light to leave substantially the Raman shifted frequency light components.

9.(Original) The method of spectroscopic diagnosis of Claim 6 further comprising coupling the laser radiation from a laser radiation source to a fiber optic cable to transmit the laser radiation onto the portion of tissue.

10-18 (Cancelled)

19.(New) A spectroscopic system for diagnosis of a body lumen of a patient, the system comprising:

a light source emitting radiation ~~in~~having an infrared ~~spectrum~~ wavelength;

a fiber optic catheter optically coupled at a proximal end to the light source, the light source delivering infrared radiation in a radial direction at a distal end of the fiber optic catheter to illuminate a portion of a wall of the body lumen, the catheter collecting infrared radiation from the body lumen for delivery to the proximal end of the catheter;

a detector that is optically coupled to the proximal end of the catheter that detects the collected infrared radiation; and

a data processor processes detected infrared radiation to provide spectral data.

20.(New) The system of claim 19 wherein the data processor further comprises a program that analyzes spectral data to diagnose the body

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lumen.

21. (New) The system of claim 20 wherein the data processor further comprises a program that analyzes a plurality of infrared absorption frequencies.

22. (New) The system of claim 20 wherein the data processor further comprises a program that identifies cancer in the body lumen.

23. (New) The system of claim 20 wherein the catheter has a size for insertion in the body lumen that comprises an artery.

24. (New) The system of claim 23 wherein the data processor further comprises a program that identifies cholesterol in the wall of the artery.

25. (New) The system of claim 23 wherein the data processor further comprises a program that identifies plaque in the wall of the artery.

26. (New) The system of claim 23 wherein the data processor further comprises a program that identifies a lesion comprising a fibrous cap in the artery.

27. (New) The system of claim 19 wherein reflectance data in an infrared range are collected by the catheter.

28. (New) The system of claim 19 wherein Raman data are collected by the catheter.

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29. (New) A method of spectroscopic diagnosis of a body lumen of a patient, the method comprising:

positioning a distal end of a fiber optic catheter adjacent to the wall of the body lumen;

irradiating the wall of the body lumen in a radial direction from the distal end of the catheter with infrared radiation from a light source that is optically coupled to a proximal end of the catheter;

collecting infrared light from the wall of the body lumen at the distal end of the catheter; and

analyzing the collected light with a spectral analyzer that is optically coupled to the proximal end of the catheter and a data processor to provide spectral data to measure an optical characteristic of the body lumen.

30. (New) The method of claim 29 wherein the step of analyzing further comprising analyzing a plurality of absorption light components and background light components to diagnose the body lumen.

31. (New) The method of claim 30 further comprising removing one or more background light components from the detected light to leave substantially the absorption light components.

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32. (New) The method of claim 29 wherein cancer is detected in the body lumen.

33. (New) The method of claim 29 wherein the body lumen is an artery.

34. (New) The method of claim 33 wherein cholesterol is detected in the wall of the artery.

35. (New) The method of claim 33 wherein plaque is detected in the wall of the artery.

36. (New) The method of claim 33 wherein a fibrous cap is detected in the wall of the artery.

37. (New) The method of claim 29 wherein reflectance data are collected by the catheter.

38. (New) The method of claim 29 wherein Raman data are collected by the catheter.